



Optimising Digital Health Insurance Products: The Role of AI-Driven Personalisation in Enhancing Customer Satisfaction and Cost Efficiency

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Abstract

Background: The use of artificial intelligence (AI) in digital health insurance has enhanced traditional insurance models by providing customised insurance, efficient and fast claim processing, and financial savings. By leveraging the strength of AI, insurance companies will be able to determine the risk level and offer personalised insurance policies in real-time, tailored to the health conditions and activities of policyholders. Yet, there are specific objections to algorithms, including concerns about data privacy and secrecy. **Objective:** The study aimed to evaluate the efficacy of AI-based personalisation in the framework of digital health insurance. Key aspects to be examined included satisfaction rates, costs, and the ethical and compliance issues surrounding these. **Methodology:** A qualitative research technique was employed in this study, involving 16 policyholders, insurance industry officers and staff. Thematic analysis was used to analyse the data in an attempt to determine pertinent themes and topics, such as the trustworthiness, transparency, affordability, the relevance of AI in claim processing, and ethical concerns, such as unconscious bias and data safety. **Findings:** The discussion reveals that the coverage of AI in the insurance can be defined in terms of pleasing the clients with accessibility, automation, and flexibility of prices. Nevertheless, the data protection, balance of data, and, thus, the role of algorithms in decision-making can still be considered severely problematic. **Conclusion:** AI can break the traditional form of health insurance in the times of the digital revolution, but the dilemma and the challenges related to the ethical use of AI and legal regulations of their application must be taken into account to achieve equality and to generate the required element of trust and accountability in the new models of insurance.

Keywords: Artificial intelligence, Health insurance, Customer satisfaction, Digitalisation

Introduction

The current global health insurance industry has undergone significant evolution due to technological advancements, shifting consumer expectations, and the increasing demand for quality yet affordable healthcare. Many of the traditionally formed insurance systems, which centre around principles such as evaluating the probability of potential risks and offering differentiated yet standardised policies, are lacking in their ability to meet policyholders' demands effectively. As a result, customers have been experiencing issues such as complicated policy decisions, slow claim processing, and limited choices regarding policy customisation (Balasubramanian and McElhaney, 2024). The diversified range of products in the health insurance sector, facilitated by Artificial Intelligence (AI) in digital health insurance solutions, has brought new opportunities for efficiency, streamlined operations, and the creation of

innovative products tailored to individual health statuses. AI in transforming insurance enables insurers to adopt machine learning, big data analytics, and automation, which assist in risk assessment and premium pricing to tailor insurance solutions to customers, a concept known as value-based retail insurance (Paul, 2024).

One of the most significant innovations in this field is the application of AI personalisation. Real-time data processing, big data analytics, and machine learning are utilised to develop health insurance products tailored to policyholders' needs. The current health insurance models confine customers to categories based on age, gender, and occupation, and provide standard policies that may not meet policyholders' specific needs (Charpentier and Vamparys, 2025). On the other hand, AI-based personalisation utilises several factors, including medical history, habits, and inputs from wearable devices and behaviours, to design plans that can be customised to fit the individual's health risks and their preferred choices. It also increases customer interest in insurance products, encourages individuals to adopt health-conscious behaviours, and makes insurance more accessible (Božić, 2023). AI-enabled chatbots, virtual assistants, and self-service platforms enhance the customer interface by offering policy advice, claims updates, and real-time support, thus reducing friction in the insurance process (Ravi and Vedapradha, 2024).

Customer satisfaction and costs have become two key trends in health insurance systems due to the advancement of AI. AI enables personalisation in customer experience that would enhance access, openness, and service delivery, thereby improving customer satisfaction. For instance, AI techniques can filter customer queries, predict potential medical issues, and offer relevant policy changes or more affordable options. Moreover, risk management and fraud detection techniques, enabled by AI, assist insurers in streamlining and improving their pricing strategies and methods, rendering them less costly than conventional underwriting and claims evaluation (Jaiswal, 2023). By reducing premiums and applying innovations such as big data and data analytics, which enable the development of dynamic, real-time, and individualised pricing models, AI-driven health insurance products can better cover even higher risks and make coverage more affordable, while providing policyholders with tangible benefits that correspond to their actual health issues.

Nevertheless, using AI in personalising health insurance has certain hurdles that must be overcome for systematic implementation and continuation. One fundamental issue is related to data protection and confidentiality. For this reason, as AI systems rely on substantial user data to recognise personal health information, financial data, and behavioural patterns, customers may feel uncomfortable sharing their data, given they are concerned about the misuse or loss of their information (Hanna et al., 2024). Some essential measures contributing to these risk implications include proper regulatory compliance, the correct use of ethical AI techniques, and open data management to prevent unauthorised data access while maintaining the fairness of the AI decision-making system (Agu et al., 2024). Yet another obstacle is the issue of bias in AI models that are used in insurance. This means that an AI system trained using biased data or flawed prior assumptions may prejudice specific demographics by subjecting them to higher premiums or restricted choices. The insurance industry must consistently verify and validate AI models to prevent bias and ensure the accuracy of new risk assessment and pricing models (Fritz-Morgenthal, Hein, and Papenbrock, 2022).

There is significant evidence regarding AI's benefits, such as efficiency improvement, fraud reduction, and automation of several manual processes in health insurance. There is comparatively scarce empirical literature on its effects on customer satisfaction and cost-effectiveness. Most of the existing literature remains technical, focusing on implementation issues from the perspective of insurers rather than the impacts and perceptions of consumers regarding AI-driven personalisation. However, there are limited qualitative insights regarding how customers use and experience insurance with AI capabilities, whether it is perceived as fair and transparent, or whether these platforms are considered affordable and easily accessible (Fundira, Edoun and Pradhan, 2024). It seems critical to fill these gaps to know how to innovate further and deploy digital health insurance products powered by AI, meeting the intended customer needs and wants while conforming to established ethical and legal standards.

Based on the factors mentioned above, the study aims to evaluate the influence of AI-based personalisation on customer satisfaction, trust, fairness, and engagement, as well as cost optimisation in the delivery of digital health insurance, and ethical concerns, including bias, privacy, and transparency.

Methodology

Research Design

This research employed a qualitative method to establish the effects of AI-centred personalisation on customer satisfaction and the cost-effectiveness of health insurance companies' digital services. Qualitative research is suitable for this study because customers and policyholders often hold broad, non-concrete, and sometimes even ambiguous or abstract views about insurance products that are robotised or underpinned by AI (Creswell and Poth, 2016). In analysing the responses given by the customers, the study adopted the thematic analysis technique and NVivo software to aid in categorising and coding data.

Data Collection Method

The research employs semi-structured interviews as the primary source of data collection. Semi-structured interviews also allow for considerable freedom in selecting participants and their opinions. The interview questions were developed based on a review of previous research on the use of AI in digital health insurance. They were piloted, with slight modifications made to align them with this study's aims and objectives (Majid et al., 2017).

A total of 16 participants, including policyholders and industry professionals, have worked within the health insurance industry and interact with AI-powered digital platforms. In this case, purposive sampling was employed to gather in-depth and diverse information about the phenomenon of interest: AI-based personalisation of health insurance (Abbas, 2023). The participants were sourced using the convenience sampling technique via professional connections, social media, and invitations to users of artificial intelligence insurance applications.

Data Analysis

The use of thematic analysis enables the systematic analysis of data for patterns, facilitating coding and interpreting qualitative data, which is particularly useful when studying customer attitudes, trust, and cost efficiency in health insurance, including the application of artificial intelligence (Braun and Clarke, 2006). Interview data collected was transcribed, coded, and categorised into customer trust, affordability, transparency, and issues regarding the implementation of AI technology. Themes were analysed for similarity and consistency before

being classified into data themes related to the research questions (**Table 1**). The automation features of NVivo improved data organisation, coding, and theme extraction to ensure the credibility and dependability of the analysis (Brandão, 2015).

Table 1: Thematic analysis

Codes	Themes	Sub-Themes	Participants
Trust in AI	Customer Trust	Reliability of AI-based decisions	P1, P3, P5, P7, P13
Transparency	Customer Trust	Clarity in AI-driven policy adjustments	P2, P4, P6, P8, P11
Affordability	Cost Efficiency	Impact on premium rates	P1, P2, P5, P9
AI-driven Claims Processing	AI in Claims Processing	Speed and accuracy of AI claims assessment	P3, P4, P7, P10
Bias in AI Models	Ethical Concerns	Discrimination risks	P2, P5, P8, P16
User Experience	User Experience	Ease of use and accessibility	P1, P3, P6, P9, P15
User Experience	User Experience	Effectiveness of AI chatbots	P3, P4, P7, P14
Data Privacy	Data Security	Customer concerns over data misuse	P2, P7, P10, P14
Automated Recommendations	AI-driven Decision Making	AI-based policy suggestions	P4, P5, P9, P12, P16
Personalisation	Personalised Insurance	Customisation of policies	P1, P6, P8, P10, P11

Ethical Considerations

This study adhered to institutional guidelines for obtaining ethical clearance. All participants sought informed consent before participating in the interviews. Data confidentiality and anonymity were retained in this study to meet the requirements and protect the participants' data (Kang and Hwang, 2023). To reduce bias, the researcher kept an interpretative and methodological journal to record their impressions and decisions (Bhandari and Hallowell, 2021).

Reliability and Validity

The following credibility technique was employed to establish the study's trustworthiness: after completing the interviews and taping, participants were allowed to review their transcriptions (Hayre, 2021). This was achieved by comparing the findings with the existing literature and incorporating expert opinion to achieve triangulation. Further, inter-observer reliability measures were incorporated by having another researcher review the codes and themes generated and exported by NVivo to increase the study's credibility (Halpin, 2024).

Results

Theme 1: Customer Trust in AI-Based Health Insurance

The personalisation of health insurance using artificial intelligence technology has positively impacted customers' trust in digital health insurance in several aspects, particularly regarding reliability and transparency.

Sub-theme: Reliability of AI-Based Decisions

Several participants expressed concerns about the reliability of AI-based systems in formulating health insurance policies and processing claims. The study suggests algorithmic approaches to problem-solving by employing artificial intelligence to generate accurate and efficient recommendations, which are accepted with reduced reluctance by policyholders. Some participants reported that a lack of human interaction is a concern, as it may lead to incorrect or biased insights, which can erode trust (Payton, 2024).

Sub-theme: Transparency in AI-Driven Policy Adjustments

The level of transparency was the most significant factor in creating customer trust. The participants indicated that these models should explain changes in policy, premiums, and qualifications for coverage. Insurance firms that do not articulate understandable AI-driven decision-making risk straining the customer's confidence, especially as many seek a more transparent process to deliver personalised policies (Naslednikov, 2024).

Theme 2: Cost Efficiency and Affordability

AI applications in digital health insurance aim to enhance cost efficiency by achieving efficiency gains through the elimination or reduction of overhead costs.

Sub-theme: Impact on Premium Rates

Since AI enables continuous monitoring of a person's health, risk factors, and other variables that may impact the pricing of a health insurance policy, flexible and individualised prices are attainable. Some participants observed that applying AI in risk assessment means low-risk individuals are charged lower premiums. However, concerns have been raised about the vulnerability of AI models, which can negatively impact specific population groups by predicting higher risk premiums based on flawed data (Pingili, 2024).

Sub-theme: AI-Driven Claims Processing

The use of AI in claim processing has dramatically eased the time it takes for claims to be examined and approved. The automated claims satisfaction analysis has been improved, with participants expressing satisfaction with the timeliness and quality of the evaluation process compared to the manual underwriting process. Nevertheless, some people were concerned that such claims might be rejected due to the automated system's lack of human due diligence (Riikinen et al., 2018).

Theme 3: Ethical Concerns in AI-Based Personalisation

One ought to be aware of specific ethical issues that may arise with the application of an AI-powered insurance model, such as bias, discrimination, and privacy concerns related to data.

Sub-theme: Discrimination Risks and Bias in AI Models

The interest in the possibility of discrimination caused by the use of AI solutions was revealed to be one of the new topics. Issues of ethical status were also recognised as other forms of danger, including the potential for AI models to reinforce existing systems and processes by providing extensive insurance coverage to individuals with high-risk health histories and unhealthy lifestyles, based on their demographic information. According to the research, AI models should be audited to avoid the issue of discrimination when handling policyholders (Hanna et al., 2024).

Sub-theme: Data Privacy and Security Concerns

Most respondents were also concerned about the vast amount of data collection that has come with AI-enabled health insurance. Several policyholders did not disclose their health

information because they felt that unauthorised individuals could misuse or access their data. AI integrity and security concerns, such as the use of adequate encryption and respect for clients' rights, as well as the provision of laws, were identified as crucial to developing consumer confidence in various AI systems (Agu et al., 2024).

Theme 4: User Experience and Accessibility

Customer satisfaction depends on the usability and accessibility of these AI-powered digital health insurance platforms.

Sub-theme: Ease of Use and Navigation

Most participants expressed satisfaction with the AI interfaces and services within insurance platforms, citing the ease of access to these services. Chatbots and virtual assistants were especially appreciated for their feature to answer policyholders' questions in real-time, thus enhancing the most significant value – engagement (Patil, Kulkarni and Hudnurkar, 2024).

Sub-theme: Effectiveness of AI Chatbots

Chatbots are now the standard in digital health insurance because artificial intelligence has become an indispensable tool in the healthcare industry. As mentioned by many participants, although these chatbots are very effective in responding to basic inquiries and managing policies, they are not always subtle enough to address intricate problems. Several participants appreciated the idea of mixed assistance, in which human beings provide support when AI-based support is insufficient (Kyrylenko, 2024).

Theme 5: AI-Driven Decision-Making and Personalisation

Using AI to offer custom health insurance policies was a breakthrough, but it had some drawbacks.

Sub-theme: AI-Based Policy Recommendations

Most participants noted that using predictive analytics for customising recommendations improves the system's efficiency in presenting policy options that suit the customer. AI may provide policy recommendations by analysing risk and financial potential data from real-time health data. Nevertheless, a portion of them were dissatisfied with the lack of algorithmic transparency because they did not understand how the policies were designed and executed (Ramezani et al., 2023).

Sub-theme: Customisation of Insurance Policies

The paper found that AI-based personalisation has greatly enhanced insurance policy flexibility, giving policyholders the freedom to select the type of insurance provisions they want, depending on their health situation, lifestyle, and financial capacity. Some greeted this feature with enthusiasm, while others claimed that excessive customisation might lead to bizarre insurance prices, making it difficult for insurers to sustain risk pools and maintain stable insurance prices (Śmietanka, Koshiyama, and Treleaven, 2021).

Discussion

Regarding the research objective, there were specific goals that the research aimed to achieve, namely customer satisfaction and cost, to establish the impact of AI in personalisation, particularly in the context of digital health insurance. The introduction of health insurance on AI brought about specific changes that could not be considered the norm: personalised policies, robotic symmetrised processes, and better customer interactions. Nevertheless, despite these

opportunities, there are risks associated with AI adoption in the insurance sector, particularly those related to privacy, transparency, and fairness. This report has focused on how policyholders have experienced them, the cost implications, and whether they are moral or not. As illustrated in the paper, personalisation via AI technology has made customers more satisfied in the insurance sector, as it has become active and adaptable in addressing their needs. Conventional health insurance pools typically categorise customers into various age brackets based on demographic characteristics that do not necessarily reflect the actual risk. The issue, however, is that AI will perform better than regular policies that are drawn up according to an extensive range of considerations, such as health history, exercise, and other data collected with the help of wearable devices. This enables them to tailor their policies to the needs of policyholders, thus making insurance a product that suits their specific requirements. Previous work suggests the use of AI to enhance the quality of risk assessment for health outcomes and policy responses, utilising advanced algorithms and models (Charpentier and Vamparys, 2025). Furthermore, it is possible to provide customers with real-time support using virtual Assistants and chatbots, and implement help desk solutions more efficiently (Ravi and Vedapradha, 2024). Cost-effectiveness is a significant benefit of insurance facilitated by AI. Underwriting and claims processing automation contribute to efficiency enhancements and cost reduction, enabling insurers to allocate their available financial resources to other areas of need. AI also enhances fraud control by detecting fraudulent claims at an early stage in the process (Fritz-Morgenthal, Hein, and Papenbrock, 2022). In addition, it is also possible to reduce cross-subsidisation by employing pricing tools that utilise AI, which can set premiums based on the overall health status and behaviour of the policyholder. Previous studies have referred to this approach as dynamic pricing as a way of improving the efficiency and fairness of premium levies in insurance (Jaiswal, 2023).

AI-containing systems are not without their flaws, one of which is the possibility that the system may form prejudice. Since AI uses historical data for training, it perpetuates existing biases; negative data can impose negative impressions. For instance, some people may be charged more because their age, sex, or other attributes have been favourably represented in their insurance data, demonstrating that they will cost insurers more to treat, even if the rates are an inaccurate measure of their health condition (Hanna et al., 2024). Agu et al. (2024) affirmed that to avoid bias, it is necessary to conduct periodic audits of these models and establish fairness policies.

Data privacy is another significant challenge, as many of these platforms have users from diverse parts of the world with varying legal frameworks governing data protection. AI in health insurance refers to the use of big data to process personal data, encompassing medical profiles and behavioural peculiarities. Similarly, as this data fosters personalisation of policies, it also raises concerns regarding issues of security and consent. Customers are not willing to provide such details if they cannot be confident in how the information will be used or if it will be secured sufficiently. Fundira, Edoun, and Pradhan (2024) have identified other research that reveals that when data handling is transparent and security measures are well-maintained in organisations, customers can trust them. Furthermore, governments and other regulatory authorities play a critical role in establishing a code of conduct and a high standard to safeguard user information and prevent misuse (Kang and Hwang, 2023).

Another concern is the transparency of the AI decision-making process. Some policyholders fail to comprehend how insurance models powered by AI shape premiums, appraise claims or customise policies. The decisions made with the help of artificial intelligence may seem obscure and difficult to comprehend, while insurance decision-making typically does not involve complex patterns. Such unsupervised learning, sometimes referred to as the "black box" in machine learning, may cause distrust among customers (Naslednikov, 2024). Based on the literature, the following are key considerations in the insurance industry: Explainable AI (XAI), which aims to make AI's decisions transparent and acceptable to policyholders, thereby enhancing confidence in InsurTech (Ramezani et al., 2023).

AI offers several benefits in claims processing, and according to a study, it has significantly enhanced claims processing. Historically, claims assessment is a complex process that requires considerable time for review and documentation. AI enhances this by helping to review the claims data, confirm eligibility, and approve simple claims within a short period (Riikkinen et al., 2018). This has also served to enhance customer satisfaction, as policyholders are reimbursed much faster and with less hassle. However, specific issues remain regarding how fully automated systems can accurately reject claims without human intervention. Some studies have proposed a model in which the AI performs initial screening, while more complex cases are referred to professionals (Naslednikov, 2024).

AI in health insurance is also used to promote healthier behaviours among users. Several insurance companies have since begun implementing wellness rewards that include reduced insurance premiums for policyholders, contingent upon their adherence to fitness and nutrition goals as tracked by their wearable devices. This means that through tracking exercises, sleep patterns, or diet and offering incentives or bonuses to those with good health indicators, insurers can encourage policyholders to lead healthier lifestyles (Pingili, 2024). Despite these advantages to insurers and customers, concerns have been raised about the morality of people being monitored so heavily for their health. There are concerns that insurance companies should not be allowed unfettered access to personal health information, as this could infringe on the right to privacy or lead to discrimination against individuals with pre-existing medical conditions (Śmietanka, Koshiyama, and Treleaven, 2021). Non-disclosure of the policyholders' information, as well as free will to participate in such programs, are significant ethical considerations of AI.

In light of accessibility, this area has benefited from the application of artificial intelligence to simplify health insurance. Most digital insurance platforms provide on-demand policies through downloadable apps, web access, or integrated chatbots. This minimises the use of paper-based documentation and the standard customer support system, enabling users to retrieve and amend their insurance details (Patil, Kulkarni, and Hudnurkar, 2024). However, some participants in this study indicated that they would rather seek a human touch, especially when it comes to matters concerning insurance-related questions. This implies that although the adoption of AI increases proficiency in the task performed, insurers should ensure that they retain conventional customer service channels for those who are not comfortable with the new technology (Kyrylenko, 2024).

Another advantage highlighted in the study is the flexibility in policy choice enabled by the use of artificial intelligence. In contrast to typical insurance contracts that limit available options, AI is capable of selecting the best coverage based on the policyholder's dynamically

changing health and lifestyle parameters. This way, policyholders receive plans that meet their individual needs, rather than absorbing services they might not even need (Božić, 2023). However, over-personalisation is an issue that creates difficulties with risk-sharing principles. On the one hand, low-risk patients pay disproportionately low premiums, while high-risk patients pay significantly higher costs; this may destabilise the market and create problems with access to health insurance (Śmietanka, Koshiyama, and Treleaven, 2021). Insurance providers must also strive to achieve a balance between differentiation and parity in their policy offerings, as the cost of insurance needs to be reasonable for as many policyholders as possible. From a regulatory perspective, this raises questions on how to set the rules governing the application of AI in health insurance. Regulators can only trust AI models used for underwriting and pricing that are ethical, diverse, and non-discriminatory. Authorities are calling for AI audits, more robust rules on data protection, and increased awareness among insurance consumers (Halpin, 2024). Finally, there should be transparent processes through which policyholders can grant their consent to the use of their data and also the ability to opt out of these forms of sharing (Bhandari and Hallowell, 2021).

The use of AI in health insurance to deliver personalised experiences has several advantages, including enhancing the overall customer experience, faster claim processing, and reduced costs. Thus, certain risks associated with bias, data protection, and transparency must be discussed to make AI-assisted insurance trustworthy and fair. The explainability of AI models, the optimisation of hybrid integrated AI-human service models, and the large-scale analysis of the effects of AI-based insurance solutions on customer trust levels and the stability of the insurance market are topics of future research. By alleviating such fears, insurers can take full advantage of AI to create a streamlined, practical, and customer-oriented insurance market.

Conclusion

In conclusion, AI-based solutions can be used to increase client satisfaction and retention in the digital health insurance sector, as well as to optimise potential claims and resolve inefficiencies related to the practice of offering individual policies and automating work. However, several issues, including algorithmic bias, data privacy, and transparency, must be addressed appropriately to ensure equity in the insurance mechanism involving AI. AI enables an increase in service availability and streamlines procedures. Nonetheless, the intervention of AI and sustained control should be laboured to find a balance between them, and such a balance is vital to address complex situations and make an ethical judgment. Regulatory, accountability-driven solutions that utilise explainable AI models and foster consumer awareness will play a crucial role in the successful and effective implementation of insurance through AI in the future.

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